5 NOV 1963

Dr. Brockway McMillan, Director Mational Recommaissance Office Washington, D. C.

Dear Brock:

Analysis of the resolution distribution of CORONA photography by CIA, prompted by the Percell Group report, showed that the quality spread is much breader than anyone had expected. Purthermore, this spread cannot be accounted for by a straightforward error analysis of known effects. It is now apparent that we have a great deal to learn about the basic limitations on the quality of satellite photography, especially that produced by the CORONA area search system. One must understand the basic cause of this degradation before one can improve the system or design a significantly improved follow-on system.

Several elements of the CIA have now become interested in this problem and are continuing the inquiry begun under the CONOMA improvement study. During the MBO program review meeting of 22 October 1963, Mr. McCone and Mr. Gilpatric agreed that CIA/DD/S&T should establish a research group to explore the whole range of engineering and physical limitations on satellite photography using

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NRO review(s) completed.

the best of our national technical resources. The following provides our present thinking on how we intend to carry this out and suggests certain support from the 1800 staff, which is likely to be needed as we nove forware.

We will convene a Satellite Photography Working Group which will address itself to both the immediate question of present system improvement and to longer term problems which are fundamental to the design of future systems. The objectives noted below encompast both areas. Significant information for the solution of certain immediate problems ought to be available in approximately three months. However, it is recognized that this initial effort may indicate the desirability and nature of a long-term continuing effort of this general type.

Objectives

The objective of this group shall be to examine existing satellite and aircraft photography in detail and to explore the following points:

- a. To confact a detailed examination of satellice and aircraft photography and the system which produced it in order that!
 - (1) A statistically meaningful quantitative model of the present image quality can be derived.
 - (2) The various factors affecting image quality can be clearly identified and understood.
 - b. To combine the data obtained into a system model which satisfactorily represents

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the observed performance, including the effects of the atmosphere.

- examine the possibility for system optimization in order to minimize the effects of the various contributors to image degradation.
- d. To plan such experiments as may be required to gain needed additional insight.
- e. To recommend system or operational improvements for the present systems which will significantly improve the distribution of quality.
- f. To make a careful study of the interaction of the photo interpreters with the film so as to establish a quantitative measure of the significance of stereo coverage, color photography, film contrast and resolution.
- g. To exploit the understanding gained to devise ways in which the basic area search and high resolution spotting requirements can be accomplished with significantly improved resolution with high confidence and to suggest new systems to fulfill these requirements.
- h. To determine the relationship between the various measures of image quality.
- i. To generate an operationally useful objective measure of image quality.

Arrangements

The group will work primarily at the Mational Photographic Interpretation Center where the basic film

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data base is exploited and stored. MPIC will make switable offices, supporting personnel and technical services available for the entire three-month period. Of course, it will also be desirable to have the group or individuals visit Eastman and Westover from time to time, and we may need substantial technical support in the film processing and quality measuring areas. Some of the group may even find it useful to visit the preparation, loading and launching facilities on the West Coast, although I would expect this to be carefully focused on the objectives stated above.

We will convene the working party on 13 November at MPIC. We will begin with a two-day seminar during which we will explain the problem, describe the various systems and outline the program for the following three months. We will undoubtedly wish to call on the HRO staff or General Greer as appropriate for some of these briefings. I expect that the individuals will then return briefly to their parent organizations to gather relevant materials and organize appropriate support, after which they will return to Washington on a full-time basis.

Since we are considering individuals who are
already cleared for one or more programs
it is expected that security will pose no
problems. However, in view of recent decisions by the
BCI regarding clearance procedures for persons working
at MPIC, it is likely that everyone will be pelygraphed.
We propose to clear the group for IBBALIST, OKCART,
CORONA, LANYARD, ARGON, TALENT, KETHOLE
and COMINT. The DD/S security office will handle this
task, working with the CIA Director of Security.

Staffing and Organization

I expect to create a working task force of technically qualified individuals from both Government and

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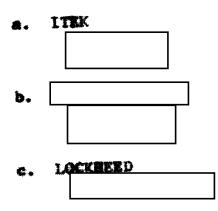
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contractor organizations. He will appoint a study director for the entire program, probably from academic life. He will be assisted by the Deputy Assistant Director for the Office of Research and Development in DD/S&T. The DD/S&T Systems Analysis Group will be exploring the needs for various kinds and qualities of coverage in parallel and this may have important technical interactions.

The main line of effort will be supplied by one or two people from each of the organizations who are principally concerned in developing, operating and processing satellite photography, especially in the COROMA program. We have contacted management of the organizations listed below, and full-time commitments for these individuals for three months have now been obtained. The individuals named were selected jointly by the DD/S&T and the companies concerned based on proven technical expertise in the field.



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d. EASTMAN KODAK
Two senior men committed, but to be named.

In addition, we may also add a senior man from Human Factors Research who would explore the photo intelligence impedance into which the entire reconnaissance effort is coupled. We will arrange a significant amount of

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staff support at RPIC to the group. In addition to the contractor personnel, of MPIC will be a working member of the study group and I would hope that one or more technical specialists from the REO staff could also be made available nearly full-time for this effort.

PUNDING

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In the interest of launching this effort promptly we will fund the activity out of CIA funds contained within the regular DD/S&T research budget. However, since the effort will benefit the MRO program as a whole, we feel that DD/S&T should be reimbursed from FY 64 MRO funds. It is difficult to estimate how much will be required to pay salaries and travel expanses since this will be determined largely by the individual arrangements we are making with the companies involved. I assume that CIA and other government members will serve at no cost. Therefore, I think that a planning figure of _______ ought to be adequate for the first three months.

SUPPORT REQUESTED

I believe that we are well launched on this enterprise, but would welcome any comments on the objectives you have time to make. Certainly, the effort should be so constructed as to be of maximum value to your program. As noted above, we will probably require three types of support from the NRO:

- a. Designation of a liaison efficer on the BRO staff who can support the group by arranging visits and briefings.
- b. Momination of one or more technical individuals from the NRO staff who could serve under the chairman as working members of the group.

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c. Agreement to reimburse DD/S&T for the direct costs of this group up to out of FY 64 NRO funds: We would, of course, welcome your continuing interest and participation during the course of the research.	25X
Sincerely yours,	
Albert D. Wheelon Deputy Director	
cc: Dr. Fubini, DOD	
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